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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/534,087	01/20/2006	Yuning Li	11439-1	2438
25277 7590 06/09/2009 NATIONAL RESEARCH COUNCIL OF CANADA 1200 MONTREAL ROAD BLDG M-58, ROOM EG12 OTTAWA, ONTARIO, K1A 0R6 CANADA				
			EXAMINER WILSON, MICHAEL H	
			ART UNIT 1794	PAPER NUMBER
			MAIL DATE 06/09/2009	DELIVERY MODE PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

### Office Action Summary

**Application No.**

10/534,087

**Applicant(s)**

LI ET AL.

**Examiner**

MICHAEL WILSON

**Art Unit**

1794

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 02 March 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☐ Claim(s) 3, 6, 7, 9-11, 13-16 and 18-25 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 3, 6, 7, 9-11, 13-16, and 18-25 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/888)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Response to Amendment*

1. This Office action is in response to Applicant's amendment filed 2 March, 2009, which cancels claims 1, 2, 4, 5, 8, 12, and 17 amends claims 3, 6, 7, 11, 13, 16, and 18-23 and adds new claim 25.

Claims 3, 6, 7, 9-11, 13-16, and 18-25 are pending.

2. The objection(s) to the specification in the Office Action mailed 30 October, 2008 is withdrawn due to applicants explanation in the reply filed 2 March, 2009 and the filing of a marked up copy of the substitute specification.

3. The objection to the drawings in the Office Action mailed 30 October, 2008 is withdrawn due to applicants' submission of a marked-up copy of the drawings.

4. The rejections under 35 U.S.C. 103(a) of claims 1-9, 11-18, and 21-24 as being unpatentable over Woo et al. (6,309,763 B1) in view of Snyder et al. (Aryl boronic acids. II. Aryl boronic anhydrides and their amine complexes.) and Anderson et al. (US 2003/0072943 A1), claims 10 and 19 as being unpatentable over Woo et al. (6,309,763 B1) in view of Snyder et al. (Aryl boronic acids. II. Aryl boronic anhydrides and their amine complexes.), Anderson et al. (US 2003/0072943 A1), and Yu et al. (US 5,055,366), and claim 20 as being unpatentable over Woo et al. (6,309,763 B1) in view of Snyder et al. (Aryl boronic acids. II. Aryl boronic anhydrides and their amine complexes.), Anderson et al. (US 2003/0072943 A1), Yu et al. (US 5,055,366), and

Zheng et al. (US 6,268,072 B1) are withdrawn due to applicant's amending of the claims as persuasive argument in the reply filed 2 March, 2009.

### ***Claim Objections***

5. Claim 11 is objected to for referring to claim 25 twice. A claim should only refer to the claim it depends from once, additional references are redundant and make the claim unnecessarily complicated and confusing. A suggested correction is to change lines 6-9 of the claim to read --a layer of said composite, and cross-linking--.

### ***Claim Rejections - 35 USC § 112***

6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7. Claims 3, 6, 7, 9-11, 13-16, and 18-25 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claims 21 and 25, the recitation of "but at least either a (or b), or c is larger than one" is confusing and makes the scope of the present claim indefinite. A suggested correct would be to recite --but a least one of a, b, and c is larger than one.-- Claims 3, 6, 7, 9, 10, 11, 13-16, 18-20, and 22-24 are indefinite by dependence.

Further regarding claims 21 and 25, the recitation of "a functionality selected from hole transporting, electron transporting and light emitting and a mixture thereof" is indefinite. It is unclear if "electron transporting *and* light-emitting" is one or two options

making the scope of the claim indefinite. A suggested correction is to recite --a functionality selected from hole transporting, electron transporting, light emitting and a mixture thereof--.

Regarding claims 11 and 16, the phrase "such as" renders the claim indefinite because it is unclear whether the limitations following the phrase are part of the claimed invention. See MPEP § 2173.05(d).

***Allowable Subject Matter***

8. Claims 3, 6, 7, 9-11, 13-16, and 18-25 would be allowable if rewritten or amended to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph and claim objection, set forth in this Office action.
9. The following is a statement of reasons for the indication of allowable subject matter:

While the prior art, Woo et al. (US 6,309,763 B1) and Yu et al. (US 5,055,366), teach polymers with various functionalities including hole transporting, electron transporting, and light-emitting and also teaches copolymers of carbazole, fluorene, and arylamine, the prior art does not teach or suggest the polymer (cross-linked composite) as presently claimed. The present polymer contains boron group condensed into boroxine rings as a part of the polymer chain. The boron is not eliminated during chain formation like in the Suzuki coupling reaction used by Woo et al.

The prior art, Anderson et al. (US 2003/0072943 A1), does disclose that boronic acid or boronates can be incorporated into a polymer, however the reference does not

teach the polymer to cross-link forming boroxine rings as presently claimed. The reference also does not teach or suggest the suitability of boron cross-linking groups in functional polymers as claimed.

### ***Conclusion***

10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to **MICHAEL WILSON** whose telephone number is (571) 270-3882. The examiner can normally be reached on Monday-Thursday, 7:30-5:00PM EST, alternate Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Larry Tarazano can be reached on (571) 272-1515. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

12. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/D. Lawrence Tarazano/  
Supervisory Patent Examiner, Art Unit 1794

MHW